

REMARKS

Reconsideration of this application as amended is respectfully requested.

Claim 13 has been amended to incorporate most of the limitations of claims 18 and 20, now canceled. As amended, claim 13 recites a piston ring having an HVOC-applied layering on its operating face with a surface roughness factor  $R_k < 0.12\mu\text{m}$  and a porosity  $< 5\%$ . Claim 13 further recites at least one of the upper and lower faces of the ring as having a galvanic protective layer applied thereto.

As discussed in the first paragraph on page 3 of the application, as well as the last paragraph on page 4, the distinction of the layering being HVOC-applied is important, since this process is needed to yield the every low porosity level  $< 5\%$  and the very smooth surface  $R_k < 0.12\mu\text{m}$ . As further discussed in these paragraphs, the low porosity and smooth surface finish are important since they act together to inhibit the penetration of corrosive electrolytes that the HVOC-applied layering gets exposed to when the galvanic protective layer on one or both top and bottom faces of the piston ring is applied. The  $< 5\%$  porosity and surface roughness factor  $< 0.12\mu\text{m}$  thus combine to prevent the penetration of the acidic electrolyte into the layering on the operating face, thereby prolonging the life of the layering, and thus the piston ring.

JP '048 and Obara are silent as to the use of the HVOC process, and certainly does not teach or suggest controlling the porosity and surface roughness at the level claimed to achieve the desired resistance to the penetration of acidic electrolyte during galvanic application of the chrome layer on the upper and lower faces.

As such, the claimed porosity level and surface roughness factor is not just an optimum working level easily discovered by one skilled in the art based on JP '048 alone or in combination with Obara, but rather the applicant has found a unique combination of features derived by use of the HVOL process which prolongs the life of piston rings by avoiding penetration of galvanic electrolytes during application of the galvanic protective layer on one or both of the top and bottom faces of the ring, which is neither taught nor suggested by JP '048 alone or in combination with Obara.

The examiner states that Obara teaches a porosity  $< 8\%$  which would included  $5\%$ . However, Obara also does not recognize that it takes both a porosity of  $< 5\%$  and a surface roughness  $< 0.12\mu\text{m}$  to achieve the resistance to the penetration of electrolyte.

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**Reply to Office action of September 4, 2007**

Accordingly, it is respectfully submitted that claim 13, as amended, distinguished applicant's invention patentably over JP '408 alone or in combination with Obara.

Claim 23 has been amended in similar manner to recite the combination of porosity < 5% and surface roughness < 0.12 $\mu$ m. Accordingly, for at least the same reasons given above in support of claim 13, it is respectfully submitted that claim 23 distinguishes applicants invention patentable over JP '408 alone or in combination with Obara and should be allowed.

It is believed that this application now is in condition for allowance. Further and favorable action is respectfully requested.

The Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 04-1061.

Respectfully submitted,

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Date

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